

## Motivation readiness of future software engineer's professional self-improvement and prospects of its formation in college cloud environment

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**Abstract.** Innovative technologies have an impact on the countries socio-economic development, the structure of labor market and educational services transformation. Rapid IT industry development constantly requires qualified programmers capable of professional self-improvement throughout life, the driving force of which is the individual motivation which activates the individual self-development process, optimizes thinking and develops special professional qualities, moral and ethical values. The main article purpose is to analyze the state of the form of motivational readiness for future programmer's professional self-improvement, to identify problems of its formation in colleges and to determine the ways of its increase as one of the main factors of quality improvement. To achieve it, a complex of theoretical and empirical methods was used, with help of which a number of problems were revealed which slow down the process of improving the quality of future programmers professional training. To eliminate them, a system of phased motivation for future specialists professional self-improvement has been developed on the basis of general secondary education, which can be integrated into the teaching of both general education and professionally-oriented disciplines; ways of improving the quality of the educational process through the creation of a cloud of oriented environment, the introduction of innovative teaching technologies, special training of teachers in the system of professional development.

**Keywords:** readiness, motivation, professional self-improvement, college, IT-specialists.

## **1 Introduction**

### **1.1 Statement of the problem**

Modern progress in the software field, human's life various spheres computerization requires the formed skills of self-improvement, which will be necessary for the future software engineer to maintain the status of IT-specialist, constantly follow the innovations in their professional world, master and apply them in practice, to improve their skills [16; 18; 45; 51]. Ultra-fast rates of computer and information technologies development put on time the need for such IT-specialists capable of creative search and continuous self-education, who independently and continuously replenish their knowledge, improve their own skills and professional skills [57, p. 5]. Formation of such abilities at the future technicians-programmers for today is extremely important problem for pedagogical collectives of colleges. Its solution will allow the requirements of the labor market and ensure the competitiveness of college graduates on it. After all, the development and implementation of technological innovations cause their integration into all sectors of the economy, which leads to the reorganization of industries, companies, the use of new opportunities at each workplace, therefore, changes in priorities in the professional training of specialists for the IT-industry [12; 20; 26; 42].

### **1.2 Analysis of recent research and publications**

As the analysis of scientific works shows, in recent years, scientists and practitioners have increasingly raised the problem of forming a readiness for professional self-improvement of future specialists during training in vocational and higher education institutions. That's because "lifelong learning is becoming increasingly important for our societies and economies, as well as for the wellbeing of our citizens" [27, p. 5]. Formation of readiness for professional self-improvement of future software engineers is a process of conscious, permanent formation of personality, aimed at high professional achievements through constant progress to perfection, which is realized through motivation, planning, organization and personal control [58].

The results of studying problem of the formation of readiness for professional future software engineer's self-improvement indicate the existence of a number of complex issues caused primarily by the low level of motivation of students to acquire knowledge, skills and ability to self-development. The meaning of the concept of "selfdevelopment" is often considered by scientists in the circle of such categories as "professional self-development", "self-improvement", "professional self-improvement". In pedagogy, professional self-improvement is understood as "a conscious, purposeful process of raising the level of one's own professional competence and development of professionally significant qualities in accordance with social requirements, conditions of professional activity and own development program" [8, p. 41]. Mykhailo M. Fitsula notes that the reference point in the development of professionalism of a future specialist is his qualification characteristic, "on the basis of which a program of individual self-study for future professional activities is built.

Requirements for a modern specialist should correspond to modern needs” [8, p. 41]. Motivated students will demonstrate a higher level of readiness for professional self-improvement of future software engineers, will further promote their social mobility, continuous professional development, will allow them to gain access to higher education at any time of life [39, pp. 5–6] and to develop a strategy for career growth.

The issues of forming the development of professional self-improvement of various specialists are revealed in the scientific works: Oleksandr V. Didenko [6], Aleksandr A. Galochkin [9], Galina V. Grivusevich [11], Galina A. Klimenko [17], Arie W. Kruglanski [21], Liudmila V. Markelova [24], Irina A. Pogrebnaia [35], Tetiana V. Shestakova [46], Larysa O. Sushchenko [52], Zoia V. Turianytsia [53].

Grigorii A. Volkovitchii studied the formation of motivation for professional self-improvement [62], and its dynamics was studied in the dissertation of Irina S. Vasilenko [59]. The results of the analysis of scientific works testify to the diversity of forms, methods, means, technologies and methods of both the formation and development of readiness for professional self-improvement of various specialists in modern educational institutions, as indicated by Kadyrbech D. Dzybov [7], Serik Praliyev [39], Botakoz I. Sarsenbaeva [44]. However, the majority of scientific research is aimed at studying the problems associated with the professional development of teachers [3; 15; 29; 30; 33; 49; 54; 60; 61; 63; 64]. As of today, we have not identified any studies in the open access, which reflect the results of the formation of readiness for professional self-improvement of future software engineers.

### 1.3 The purpose of the article

Taking this into account, the purpose of this article is to analyze the motivational readiness for professional self-improvement of future software engineers, to identify problems of its formation in colleges and to determine the ways of its improvement as one of the main factors in improving the quality of their training.

## 2 Research methodology

In order to achieve the goals of this study, we applied a set of theoretical and empirical methods. Theoretical analysis of pedagogical, psychological research (Alexander A. Galochkin [9], Galina V. Grivusevich [11], Galina A. Klimenko [17]) with the use of methods of analysis, comparison and synthesis and structural-semantic analysis of vocabulary allowed to define the essence of the concept of “readiness” and to highlight its main components. Based on the study of materials related to the psychological aspect [13; 14; 21; 22; 39; 65], clarifies the essence of the concept of motivational readiness” and its impact on the effectiveness of self-improvement of specialists. The study of experience and best practices is covered in the works of Kadyrbech D. Dzybov [7] Olexander V. Didenko [6].

Our analysis is based on empirical methods, including questionnaires to study: cognitive activity of students (Boris K. Pashnev [32]) and motivation of success and fear of failure (Arthur A. Rean [43]) questionnaire for self-assessment by future

software engineers of readiness for professional self-improvement and revealing students' understanding of the meaning of professional self-improvement (developed by the authors). A total of 363 students were interviewed (a sample of 6,691 students from the general population who attended colleges and technical schools in this specialty). The received data are analyzed, a number of problems of formation of motivational readiness of students to professional self-improvement are revealed.

### **3 Results and discussion**

At the beginning of the study we considered it necessary to define the essence of the scientific category "readiness". On the basis of the study of scientific works we have come to the conclusion that readiness is a system characteristic, dynamic education, active state of personality, a set of professional and pedagogical knowledge, skills, skills and personal qualities, purposeful expression of personality, integral expression of all substructures of personality. Personal education, integrative quality, result of professional and pedagogical training, essential precondition for effective activity.

Structural and semantic analysis of the definition of "readiness", carried out with the use of vocabulary and scientific literature, allowed to identify a number of structural components, namely: motivational readiness (cognitive and professional interests), intellectual readiness (general and special abilities, system of knowledge, skills and abilities), emotional and volitional readiness (attitude to learning, self-control) and social readiness (communicative abilities and responsibility, consciousness in a situation of choice) [58, p. 107]. The content of these components allows us to speak about their correlation with the description of the National Qualification Framework (Ukraine) [38] and their correspondence to the very character of "ascent of each person on" the stairs of "formation of his personality" (Sergei Ia. Batyshev) [1, p. 10].

In order to solve the problem of formation of readiness for professional self-improvement of future software engineers, the component of which is motivation readiness, it is important to define the content of each of the above mentioned components. To this end, we have turned to the theory of professional education. It was found out that at the first stage of formation of a specialist's personality, as a rule, elementary and functional literacy is achieved, i.e. basic knowledge, skills and abilities, worldview and behavioral qualities of a person, necessary for a wider and deeper education, are formed at an accessible, minimum necessary level [1, p. 10]. According to the Ukrainian legislation, elementary and functional literacy is formed at the level of basic secondary education [66] (second level of the National qualification). That is why ninth-grade secondary school graduates enter the college and are suitable for "performing typical simple tasks in typical situations in a well-defined structured sphere of education, performing tasks under the guidance of a supervisor with elements of independence" [38]. They are expected to have a basic empirical knowledge and understanding of basic learning processes; the ability to use relevant information to perform simple tasks and solve everyday problems in typical situations, using simple rules, instructions and tools; to evaluate their own performance against established criteria; to apply reasoning to support their own thoughts and conclusions; to

communicate skills: to interact with the team to Their autonomy is characterized by the ability to learn under the control of the teacher with a certain autonomy. Thus, at the beginning of their studies, freshmen have elementary and functional literacy, formed knowledge, skills and abilities for self-development.

In the context of our research it should be noted that the professional training of future specialists in Ukrainian colleges “has a binary character: students receive both general education and vocational training at the same time as getting a diploma of junior specialist ...” [34, p. 13]. Therefore, according to the basic principles of professional pedagogy, colleges are developing individuals at the same time at the second and third levels of education.

At the second level, a future specialist acquires general secondary education: necessary and sufficient knowledge about the world around him/her and master the most general ways of activity (skills) aimed at cognition and transformation of certain objects of reality [1, p. 11]. This level corresponds to the level of specialized secondary education and the third level of the National Qualification at which it is necessary to develop the ability of a person to perform production or learning tasks of medium complexity according to certain algorithms and established norms of time and quality [38]. They should form: knowledge of facts, principles, processes and general concepts in the field of education and professional activity (in the first year of study, in addition to the curriculum, special disciplines are taught in the curriculum), the ability to perform typical tasks and solve problems through the selection and application of basic methods, tools, materials and information; assessment of the results of tasks in accordance with known criteria; the ability to work effectively in a team, perception of criticism, advice and instructions, expression of They should be aware of their responsibility to perform tasks during work and study, and of the need to adapt their behaviour to external circumstances when performing tasks or solving problems [38].

At the college, the ascent to the third stage of personal development corresponds to the degree of professional competence associated with the formation of such professionally significant qualities for the individual and society on the basis of general secondary education, which enable the individual to fully realize his or her potential in specific types of work, in accordance with the socially necessary division of labour and market mechanisms to stimulate the most productive and competitive functioning of the employee of a particular qualification

Therefore, in the course of training in college, future software engineers should be able to independently perform complex specialized production or training tasks in a particular area of professional activity and in the course of training, be responsible for the results of their activities and those of others in certain situations. It is supposed to obtain empirical and theoretical knowledge in the field of professional activity and / or training, the formation of skills to solve complex problems in specialized areas of professional activity and / or study, to find solutions to specific problems, involves the identification and interpretation of information, planning, analyzing, monitoring and evaluating their own work, the work of others in a specialized context. In terms of communication skills, software engineers should be able to communicate their understanding of knowledge, judgement and experience to a wide range of people (colleagues, managers and clients) after graduation from college, especially in the field

of professional activity; they should be able to interact with colleagues and the professional community in order to carry out professional activities or study. They will have to be prepared to manage the work of others in a professional or learning context that is subject to change and to continue further training with elements of autonomy [38].

Based on the results of the study of the peculiarities of the formation of the future specialist, which are outlined above, we believe that they should be taken into account in the formation of motivational readiness for the professional self-improvement of future technicians-programmers, starting from the first course. The scheme of stage-by-stage formation of a specialist's personality in the college is highlighted, which gives an opportunity to "systemically and holistically present the process of personal development, and, consequently, the process of educational support of such development" [1, pp. 10–11].

According to the logic of further research and in order to determine the theoretical foundations of the subject under study, we carried out a structural and semantic analysis of the conceptual field of study, which forms a circle of commonly used and close to professional self-improvement constructs: "self-development" and "self-improvement" [8]. Semantic analysis of the concept of "profession" [56, p. 570] has shown that its essence is the basic qualification, specialty, skill and even talent of a person to a certain case. In our opinion, it correlates with the concept of "self-improvement" as "improvement of oneself (physical, moral, etc.), one's professional skills, etc." [2, p. 30]. So, we can outline the range of definitions of language units that characterize the subject of our study, and clarify their essence:

- *Self-development* is an internal process of self-knowledge, on the basis of which the individual determines the life goals of transforming his or her own life to a higher level of organization;
- *Self-improvement* is a conscious and purposeful process of increasing the level of one's own professional competence and development of professionally significant qualities in accordance with social requirements, conditions of professional activity and own development program;
- *Professional self-improvement of future software engineers* is the process of individual management of the development of knowledge, practical skills and abilities of a specialist, creative abilities, optimization of methods of own thinking and special professional qualities, the formation of those moral and ethical values that contribute to the achievement of high performance in the field of computer science, modern software, automation of production and other processes.

In modern scientific works readiness for any type of professional activity is defined as a set of stable motives that do not depend on current situations. Taking into account the stated topic of our research, let's focus our attention on the formation of motivational readiness for professional self-improvement of future software engineers. Liubov Iu. Pakhomova studied it within the framework of studying readiness for professional activity [31, p. 13]. She justified its essence and structure as "an integral unity of development of components of motivational readiness of students to the profession (orientation, personal and volitional, professional and cognitive)" [31, p. 20]. The

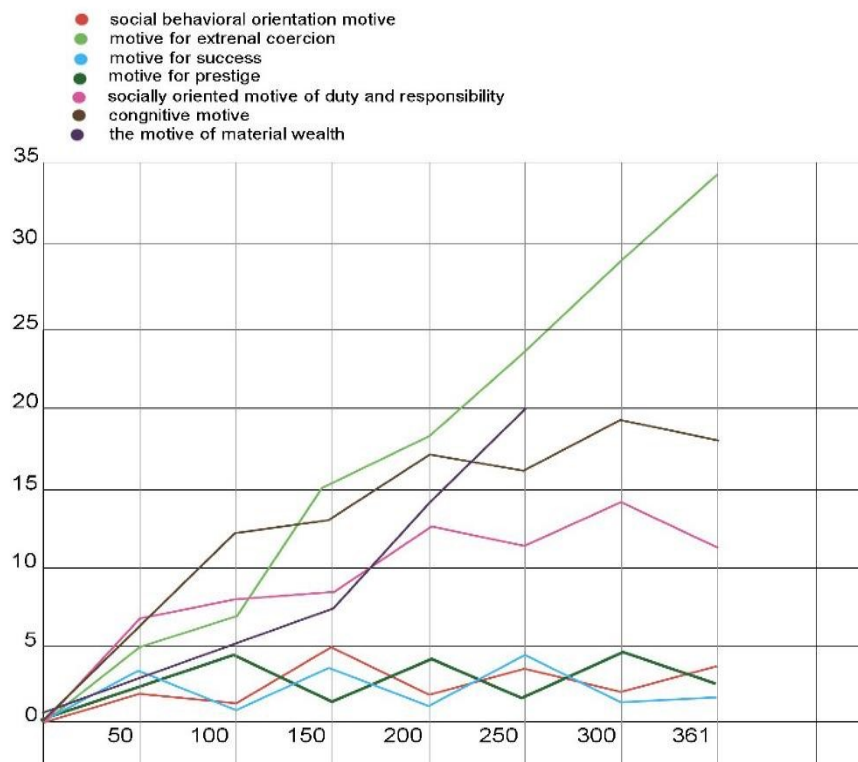
scientist singled out a set of external and internal conditions that contribute to the development of students' readiness for professional activities in the educational space of higher education institutions and change the nature of educational activities. She referred to the external conditions as follows: educational technology, which is based on the real experience of students; psychological and pedagogical support of the development of psychological features of personality; group form of work, which makes "living together with others" socially significant situations; creation of an environment for personal manifestation of students. Among the internal conditions, the scientist singled out: the level of students' personal activity as an indicator of their involvement in the work; the willingness of the student to experiment with "their behavioral repertoire in order to obtain and understand new experience"; the ability to understand the changes that occur with them in professional training [31, p. 21]. The efficiency of implementation of internal conditions aimed at the development of students' motivation for professional activity in the conditions of educational space has been proved experimentally: statistically significant changes in the Student's *t*-criterion ( $p < 0.001$ ) occurred among the students of the experimental group, and the data remained practically unchanged among the students of the control group [31, pp. 18–19].

It should be noted that in the process of professional training the role of internal motivation related to self-affirmation of a person as a professional is crucial. And it does not depend on the type of his professional activity, but always is an individual process, which depends on the personal psychological peculiarities of the subject, the method, the level and conditions of work organization, etc. [25]

The results of the Steffen Jahn and Mario Geissler study are important for our pedagogical experience. In the study of motivational readiness, they proceed from an understanding of its essence (inclinations or tendencies to meet the need for entrepreneurial activity) and the structure, which is characterized by concepts: "Behavioural intentions, propensity to act, implementation intentions, commitment". This approach gave them an opportunity to consider the concept under study as a "unified motivation", which strengthens entrepreneurial activity [14]. In their concept, they represent the "driving force of entrepreneurial activity" in the new theory of entrepreneurship. Scientists link "motivational readiness with entrepreneurial actions and the corresponding feedback effect". In their opinion, the model of motivational readiness model of entrepreneurship, developed by them, helps to better understand "why some entrepreneurs are more likely to start an entrepreneurial activity and constantly participate in it than others" [14]. Steffen Jahn and Mario Geissler conclude that in the case of "entrepreneurial entrepreneurship", motivation is primarily determined by entrepreneurial desire, while expectations soften the relationship. It is obvious that in the formation of motivational readiness as a component of the readiness for professional self-improvement of future software engineers during the training at the college it is necessary to develop in them the desire for entrepreneurial activity as a driving force for self-development and in the future for independent work in the modern labor market in the industry, which is rapidly developing and erases the boundaries between countries, integrates different knowledge, skills and competencies.

Evgeniia A. Zakharova notes that it is precisely because of “motivation that the interaction of a person with the environment and social conditions is carried out”, and the motivation readiness of a person for professional activity “is considered as an actualization of the need for personal and professional self-development in work” [65, p. 16]. Therefore, the allocation of motivational readiness in the structure of readiness of future software engineers for professional self-improvement is quite reasonable. The study of the state of its formation among students during their studies in college will improve the quality of their professional training.

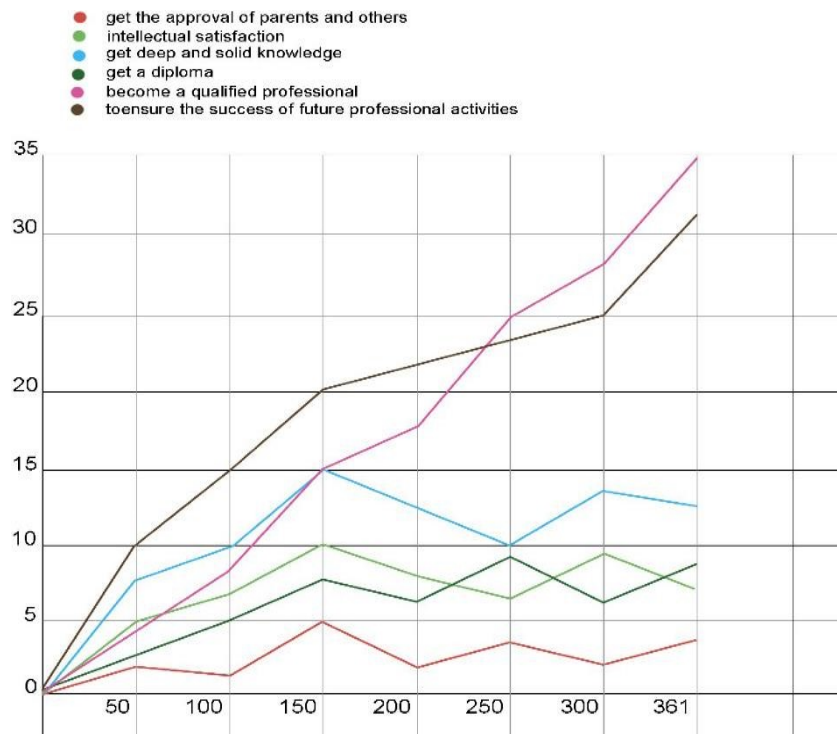
As noted above, motivation readiness is a structural component of the “readiness” design, which reflects the cognitive and professional interests of future specialists. In order to study cognitive activity, we conducted a survey of third and fourth year students using a questionnaire developed by B. Fig. 1 shows that 33.3% of students named the motive of achieving success as the main motive of their educational activity, while 28.8% of the surveyed are dominated by the motive of ensuring material wellbeing. It should be noted that one fifth of the respondents (about 20%) consider it important to receive information.



**Fig. 1.** Results of the study of cognitive activity of future software engineers (according to Boris K. Pashnev)



Similar data were obtained based on the results of the application of Arthur A. Rean's technique. 35.7% of students (Fig. 2) believe that studying at the college will ensure their success in their future professional activities and will allow them to become highly qualified specialists. However, only 12% of respondents aspire to acquire in-depth and solid knowledge, 8.3% have intellectual pleasure in learning, and 5.8% study to obtain a diploma. Summarizing it is possible to notice that modern students aspire to achievement of success in the future professional activity and material well-being, reflects moods of the Ukrainian society. At the same time, it turned out that in the understanding of most of them high success in professional activity and personal life, the level of qualification does not depend on the depth and strength of knowledge. This has led us to look for the reasons for this discrepancy.

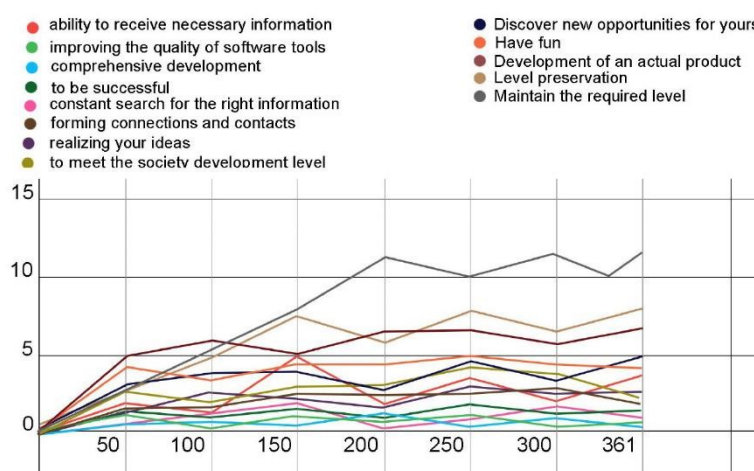


**Fig. 2.** Results of determination of the main motives of educational activity by future software engineers (according to Arthur A. Rean)

In order to find out and assess the state of students' understanding of the meaning of professional self-improvement and its importance for future professional growth, we used a specially developed questionnaire, which suggested ranking 25 indicators describing this design. The results of the survey are highlighted in Fig. 3.

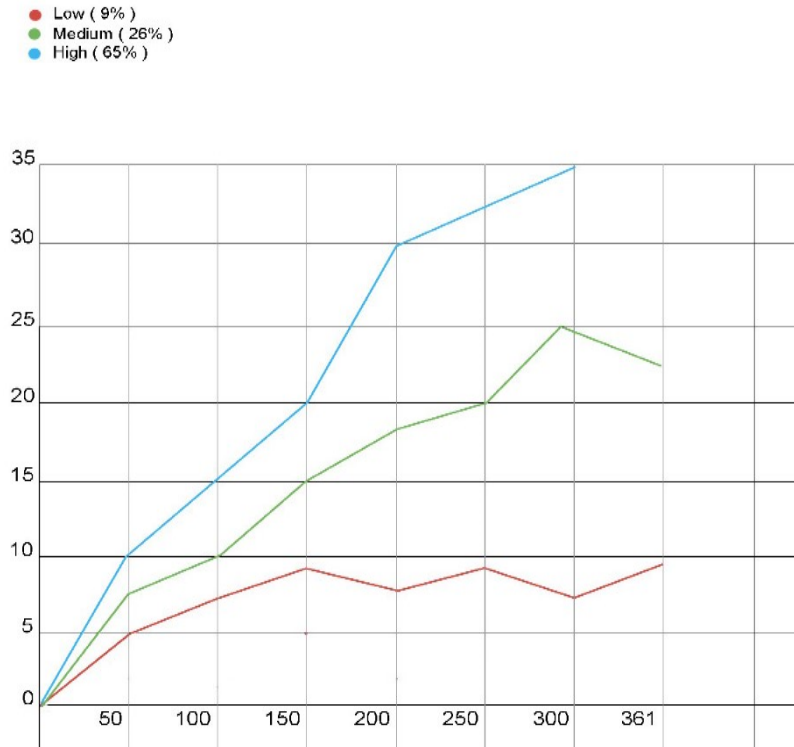
The data presented in the diagram gives us an idea of the insufficient understanding of the meaning of the concept of "professional self-improvement" by future software engineers: almost 12% of students took the first place to maintain the required level of

qualification, 9.42% – the search for the best ways to solve problems, 8.03% – the preservation of competitiveness in the labor market, 6.65% – interest in innovation, 5.82% – the development of an actual product. At the same time, the obtained empirical data and the results of the interview with certain groups of students from different colleges showed the lack of understanding of causal links between professional self-improvement and correspondence of one's own development to the level of society's development; career growth, desired level of salary and desire to study, constant search for new information; development of an actual product and independent study of the newest technologies, communication with more qualified people.



**Fig. 3.** Results of ranking the main indicators characterizing the meaning of professional self-improvement

In order to find out the students' intentions on farther development of professional self-improvement skills, we used a questionnaire developed by us. One of his questions: "What do you consider it necessary to educate yourself for your professional self-improvement?" The majority of students (28.25%) chose the following answers: ability to apply creative abilities that characterize readiness to create fundamentally new ideas different from traditional ones; systematic thinking; 19.11% – ability to persistently achieve the set goal; 13.57% – ability to use Internet resources to solve experimental and practical problems in the field of professional activity; 10.8% – ability to use professionally profiled knowledge and skills in the field of practical use of computer technologies. Only 1.7% of students pointed out the need to form the skills to apply: research skills, special knowledge in mathematics, physics, chemistry, etc. in solving professional problems, orientation in the schemes of algorithms, programs, data and systems. Despite these contradictions in the evaluation judgments about the readiness of future software engineers for professional self-improvement, the majority of them (65%) believe that they have an average level of readiness, 26% – high, and only 9% – low. These data are illustrated in the diagram in Fig. 4.



**Fig. 4.** Results of self-assessment by future software engineers of their readiness for professional self-improvement

Thus, having a high level of motivational readiness for professional self-improvement, college students - future software engineers do not all understand the main mechanisms of its formation. At this stage of research and development, it can be assumed that the high level of motivation is due to the cooperation of the majority of students in the third and fourth years of study with different employers. It is in IT companies that they get the necessary skills and experience of readiness to reach a certain state. In our opinion, this is why the majority of students (62.6%) assess their motivation to study as mediocre, another 27.42% – as high and only the rest – as low (9.97%). In the interviews with the participants of the experiment it was found out that the main internal factor in the acquisition of the profession of a software engineer is the expectation in them, which motivates to include them in the cognitive processes.

Arie W. Kruglanski notes that in terms of its intensity or motivation, it can be measured in the range from low to high degree of readiness. He studies motivational readiness in different contexts – entrepreneurial activity [22, p. 368], as well as the activities of extremist organizations [22, p. 380], but its essence is interpreted as an intention or aspiration to achieve the goal and emphasizes: a high level of motivational readiness is characterized by purposefulness and is expressed in the meaning of the goal

[21, p. 368]. In his opinion, it is much easier to find the goals of organizations than the goals of an individual. We're pretty much in agreement with that.

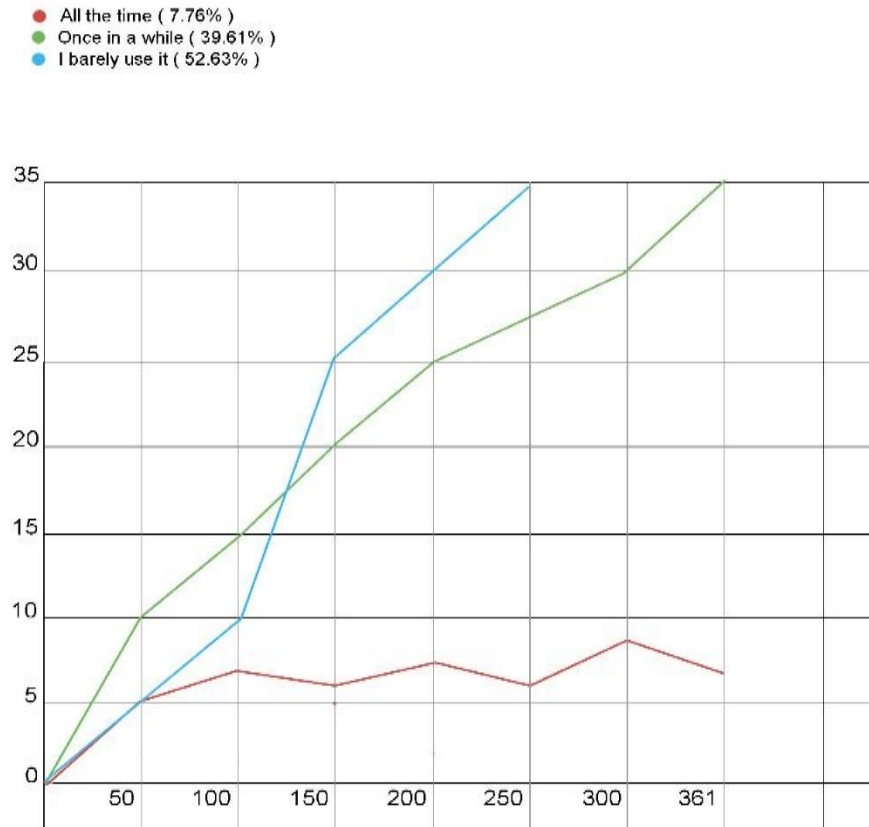
For our research it was important to identify that students aim to become successful in life and competitive in the labor market, as well as whether they have the necessary tools to achieve this goal. He was asked a number of questions to clarify the latest trend. Let's bring in a few of them. For example, to the question: "Do you want to improve yourself, read additional literature, spread your experience, are you interested in novelties in your future professional sphere?" More than half of the students (54.57%) answered that they want it from time to time. At the same time, when asked: "In training you have clear goals, you know what you want to get, what you want to know, what you want to learn, what you need to learn" 46.2% said that they know about it sometimes, and 3.88% never know about it. Thus, almost half of the surveyed students do not define goals in their learning activities and often do not know why they would like to study. It appeared that the main majority of respondents (51.25%) sometimes make a plan of action and foresee possible consequences; 56.79% sometimes resort to self-analysis of their cognitive activity. As for the emergence of problems on the way to achieving a certain goal, 47.92% of respondents said that they usually distract and slow them down, more than a third of students tend to solve their problems only from time to time, almost half (49.31%) are not always self-confident, and 16.62% – do not trust themselves at all, 24.65% have underestimated self-esteem.

Since self-improvement implies the development of professionally relevant qualities in accordance with social requirements, we have noticed that 46.81% of respondents hide their feelings and thoughts; almost 30% experience tension, anxiety and anxiety; more than a third do not always control themselves, their emotions and actions; 61.77% are reserved for critical remarks – in their opinion, only a few critical remarks should be made for constructive interaction; 41.83% experience difficulties in communicating from the ground up. They can't always listen to the rest of another person, understand and try to accept her opinion, which is different from their own more than 45% of future specialists.

Guided by the fact that the professional self-improvement of future software engineers is a process of individual management of the development of knowledge, practical skills and abilities of a specialist, students were asked to carry out self-assessment of the ability to manage other people, the organization of joint activities. The results of the survey turned out to be quite high: 36.84% consider this ability high, and 47.65% – average.

Formation of readiness for professional self-improvement of future specialists is carried out in the process of professional training in colleges and problems in definition of the purposes of cognitive activity, its planning, overcoming of difficulties in performance of tasks, development of critical thinking, communicative competence, etc. should be solved during study. Also, the student was offered several questions, the answers to which require evaluation judgments on the organization of the educational process. Thus, 48.75% of respondents believed that they do not contribute to the formation of readiness for professional self-improvement in the college. And in the opinion of 13.02% of respondents, conditions have been created to slow down this process. To the question: "How often do your teachers use active and interactive

methods (games, trainings, case studies, discussions, etc.) of learning?" The level of preparation for professional activity at this stage of education at the college is rather unsatisfactory at 23.6%, and 27.7% of respondents noted that it is difficult to answer this question (Fig. 5).



**Fig. 5.** Results of assessment of the frequency of use of active and interactive teaching methods by college teachers

Having analyzed the results of the survey of students, we believe that the formation of motivational readiness for professional self-improvement of future software engineers should be carried out taking into account the requirements of the information society. This is noted by Svitlana L. Proskura and Svitlana H. Lytvynova, who emphasize that now the level of competencies of software graduates does not meet the requirements of IT industry employers. Among the reasons they mention the insufficient level and quality: teaching of subjects related to programming, from the first to the last courses; provision of educational information; mathematical training; organization of laboratory tests; understanding of the application of knowledge gained for farther use in professional activities. In addition, scientists point to the need to apply: web-oriented

technologies of teaching programming; forms, methods and means of education that meet the needs of modern students; automated systems for checking programming tasks; intellectual maps to systematize the knowledge obtained, and more [40].

In search of ways to improve the quality of training of future software engineers in colleges, the formation of their motivation at a higher level, we turned to the scientific works of famous Ukrainian scientists. Thus, Valerii Yu. Bykov, Andrii M. Hurzhii and Mariya P. Shyshkina consider the creation of a higher education institution as one of the tools to solve this problem. The concept they have promulgated notes “The use of cloud services is aimed at improving the learning process by improving access to electronic educational resources, which is characterized by the following innovative features as adaptability, mobility, full interactivity, free network access, unified supporting systemwide infrastructure, providing a universal approach to work” [5, p. 25].

The need to formulate the motivational readiness of future programmer technicians for professional self-improvement during their professional training in college has motivated the teaching staff to search for those training tools that would meet their personal interests, correlated with the profession and youth hobbies. Observing students’ interactions with each other, their presence on social networks, and surveys have made it possible to identify these tools – Google services and various applications [4; 19]. Google services were the most affordable and convenient to use. In our opinion, the greatest effect in creating a cloud-based environment can be achieved by engaging students in this process. Therefore, they were asked to choose, together with the teachers, services that are convenient for use in the study of a particular discipline. It should be noted that this is a rather lengthy process, which is not without its various surprises. At the beginning of the use of Google services for teaching there were considerable difficulties in mastering them by the teachers, and there were some inconveniences in the interaction of the subjects of learning.

Creating a cloud-based environment in college is still in its infancy – its individual elements are being formed, and functions such as educational, developmental and communication are being mastered. The team created a project team that develops the concept of cloud-based environment development and its model. As this is a topic of a separate scientific study of applied nature, we consider it pedagogically appropriate to dwell on certain teaching aids, namely those which contribute to the formation of students’ motivational readiness for professional self-improvement. Currently, college-based cloud-based learning tools are widely used in the college to organize student activities, such as: Google services (Google Docs, Google Dictionary, Google Drive, Gmail, Google Calendar, Keep, Google Forms, Google Classroom, Blogger, YouTube). Their application makes it possible to organize collaboration both during the class and remotely (Google Docs, Google Classroom, Google Dictionary, Google Drive). Popular among students are the services that make it possible to organize educational activities: Google Calendar, Google Keep, Google Classroom. LMS Moodle should be added to this list [28]. This is due to the fact that starting from the second year, students seek to work in different companies in the future specialty, which motivates to save time, mastering self-management skills, and these services help in this.

The use of Google services in the learning process makes it possible to create cloud-based environments [10; 23; 37; 47; 48; 50; 55]. For example, in the study of humanities in Google Docs the following joint projects are created: “Collective portrait of successful technician-programmer”, “Valuable orientations of citizen of modern Ukraine”. Teachers use the Mentimeter mobile application to co-create Word Cloud with technical English words. Google Forms is an effective tool for: telecommunication projects (registration of participants of various events – conferences, competitions, seminars, workshops, competitions, etc.); organization of teamwork, self-esteem, reflection; collection of statistics on the results of the survey, questionnaire; control testing.

Teachers and students blog on Google Blogger. In this service, future professionals often post the results of their project activities, creating electronic portfolios for self-presentation and promotion of their achievements [36; 41].

It should be noted that, while constantly working with various Google services, future technicians-programmers develop their information skills, learn to work with electronic libraries, various cognitive websites, and more. They actively communicate with employers who are interested in their activities – projects, developments and more. Establishing such relationships is the best motivator for professional self-improvement.

So, creating a cloud-based environment in college involves organizing it, managing it, and further scientific exploration in that direction.

#### **4 Conclusions and prospects for further research**

Having carried out theoretical analysis and surveys to identify the state of formation of motivation readiness for professional self-improvement of future programmers, we came to the conclusion:

1. Motivational readiness for professional self-improvement of future software engineers activates the process of individual management of the development of knowledge, practical skills and abilities of a specialist, creative abilities, optimization of methods of own thinking and special professional qualities, the formation of those moral and ethical values that contribute to the achievement of high rates of professional activity in IT.
2. The students of the colleges are highly motivated in getting this profession, and at the same time they have little understanding of what kind of knowledge, skills and abilities they need; organization of the educational process in colleges needs: creation of oriented environment clouds; introduction of innovative teaching technologies; special training of teachers in the system of professional development and in the inter-course period; development of the program.
3. The result of this research is: the definition of the content of the stage-by-stage formation of motivational readiness for professional self-improvement of future IT specialists on the basis of general secondary education, which can be integrated in the teaching of both general education and professionally-oriented disciplines; identification of a number of problems that need to be solved through the use of

project technologies, wide involvement of students, teachers of colleges on the basis of partnership.

This article is aimed at the realization of the idea (the prospect of further research) to improve the quality of professional training of IT-specialists who are able to constantly improve their professional competence, quickly adapt to the requirements of the information society.

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